Rocky Flats Environmental Technology Site

Reconnaissance Level and Pre-Demolition Characterization Package for Building 333

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Revision 0

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1.0 INTRODUCTION

This Characterization Package describes the necessary surveys and sampling efforts for the Reconnaissance Level Characterization (RLC) and Pre-Demolition Survey (PDS) in preparation for release of Building 333 (B333) The RLC will confirm the type of the facility presented in the *Decommissioning Program Plan* (Type 1) The PDS requirements will be met to enable unrestricted release of building materials The characterization approach is based upon the *Reconnaissance Level Characterization Plan* (RLCP), contained in the *Decontamination and Decommissioning Characterization Protocol* (DDCP, MAN-077-DDCP), and the *Pre-Demolition Survey Plan* (PDSP, MAN-127-PDSP), including the Data Quality Objectives (DQOs) presented in both documents The DQOs used to implement this approach are presented below The DQO process was used to evaluate existing information and data and to determine additional characterization requirements necessary to define building hazards (i e , radiological, chemical and physical) per Attachment 9 of the Rocky Flats Cleanup Agreement (RFCA) and to initially identify anticipated waste streams All quality assurance requirements presented in the DDCP will be followed

Existing data on radiological and non-radiological hazards associated with the facility are insufficient to address the applicable DQO decision rules In general, existing radiological survey data are dated, too limited in terms of areas covered and type of contamination measured, and are not retrievable Likewise, there are limited data on non-radiological hazards, including possible historical releases associated with paint cleaning processes, potential beryllium contamination, asbestos-containing materials, toxic metals and PCBs in paints on building surfaces, and PCBs contained within fluorescent light fixtures The characterization requirements for B333 are summarized in Table 1-1

Radiological Characterization

Based upon historical and process knowledge, the radiological contaminants of concern for the purposes of surveys and sampling, were determined to be uranium, plutonium, and americium Radiological surveys for total and removable contamination will be conducted on interior and exterior walls, floors, ceilings, and roofs in conformance with the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) and PDSP All survey units associated with B333 will be initially characterized into two classifications Impacted Class 3 (Type 1) units and Non-Impacted Designation of Non-Impacted areas was based on the historical operations of the facility and the determination that the area has no reasonable potential for residual contamination to be present in the area Alternately, an area designated as Impacted Class 3 is an area that is not expected to contain any residual radioactivity (i e , residual radioactivity at a small fraction of the $DCGL_W$), but will be surveyed to insure the absence of residual contamination

This survey unit classification methodology was used to determine the following survey units in B333 Interior surface areas to a height of 6 feet, the exterior walls, and the roof will initially be characterized as Impacted Class 3 (Type 1) units Interior surface areas above 6 feet will be characterized as Non-Impacted, with the exception of the interior of the sand blasting rooms (Room 103 and 104) As directed in the MARSSIM and the PDSP, Impacted Class 3 survey units require a statistically determined number of randomly-generated survey points Class 3 survey units are defined as areas that are not expected to contain any residual or elevated (i e , greater than the average Derived Concentration Guide Limit [$DCGL_W$]) radioactivity Additionally, a 10% surface scan biased towards areas of highest potential for contamination will be performed

All efforts will be made to have as much equipment as possible removed from the facility prior to pre-demolition survey activities Any structural materials remaining in the building for survey and demolition (i e , piping, suspended ceiling braces, electrical breaker boxes, etc) will have the same potential for contamination as any surfaces that are surveyed or scanned Again, Class 3 implies that contamination is not

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Table 1-1: Summary of B333 Characterization Requirements

For all required surveys and sampling, historical and RLC data will be maintained in the B333 Reconnaissance Level Characterization Project File

Contaminant	Sample/ Survey Amount & Type	Comments
Radiological contaminants (Pu, U, and Am)	A total of **134** surface activity measurements (4 survey units with 32 per survey unit) plus biased scans plus 6 samples (5 reals and 1 QC) of paint and spent abrasives	Surface activity measurements will include 15 total and 15 removable contamination surveys for alpha Two (2) quality control (QC) measurements (TSA only) will be obtained for each survey unit (8 QC measurements total) Biased scans will be conducted on floors and exterior surfaces in seams, cracks, corners, and other locations where contamination is expected to accumulate A minimum of 10% of each Impacted Class 3 survey unit will be scanned Although not required in Class 3 facilities, several radiochemical (media) samples will be collected to assure no DOE-added radionuclides are present in the building, based on suggestions provided by CDPHE Specifically, 3 isotopic samples (plus 1 QC duplicate) of the painted concrete floor (slab) will be collected at biased locations, 2 grab samples will be collected from the spent abrasive material within the pit of Room 103
RCRA constituents (i e , organic solvents and metals)	A total of **15** samples from the concrete floor (3 from the west paint booth area [Rm 102A], 3 from the east paint booth area [Rm 101], 3 from the satellite accumulation area and adjacent sign shop area [Rm 102] 2 from the thinner cleaning area [Rm 102A], 2 from the abrasive blasting pit in Rm 103, 1 from the containment area in Room 104, and 1 duplicate) 4 samples of abrasive blasting waste (2 from the abrasive blasting pit [Rm 103] and **2** from the abrasive collection hoppers located outside on the west side of B333 [1 sample from each of the hoppers])	Some of the B333 floors could be contaminated with solvents used to clean paint brushes and other painting equipment (i e , the thinner cleaning area against the east wall of Rm 102A and the satellite accumulation area against the east wall of Rm 102) Therefore, 2 concrete samples from these areas need to be analyzed for VOCs (via the toxicity characteristic leaching procedure [TCLP]) to determine whether solvents contaminated the floor, or if past spills evaporated and/or were cleaned up below action levels There are multiple layers of paint on the building floor, and some of the paint contained lead and other metals Due to the multiple layers of paint on the concrete floors, use of a bulk debris rule, which would be applicable in general D&D scenarios on site, will not be applied in the case of B333 Metal concentrations in the paint may make the concrete a RCRA-characteristic hazardous waste Therefore, it is necessary to analyze the concrete for toxicity-characteristic metals (all 15 samples) No scabbling of the paint (which would constitute a separate waste stream), is planned According to historical and process knowledge, no other RCRA-regulated chemicals were used or stored in B333 (*D&D Facility Characterization Interview Checklist and Facility Checklist contained in the Project File*) Floor drains may have been grouted within the building If any depressions are noted on the concrete floors, a biased sample will be acquired within the depression All cores will retain the existing (surficial) paint layer for inclusion with the bulk concrete sample Concrete samples will be pulverized, homogenized and then split Part of the sample will be analyzed for total PCBs, and the other part of the sample will be analyzed per the TCLP Abrasive blasting was used to clean materials prior to painting The abrasive blasting waste may possess hazardous waste characteristics from metals in paints cleaned off previously painted materials Paint wastes have been assigned a RCRA D008 waste code TCLP metals results will indicate hazards presented by the abrasive and related equipment, including the air cleaning equipment and the abrasive collection system

Beryllium	**10** smears from biased locations in the abrasive blasting area and painting/drying areas (i e , where dust may have settled)	Some beryllium-contaminated items may have been brought into the building (e g , been sand-blasted prior to painting) Therefore, there is the potential for beryllium-contaminated dust to have been generated and dispersed throughout the building Sampling results will indicate if surfaces present any beryllium hazards
Poly-chlorinated biphenyls (PCBs)	Inspection of fluorescent light fixtures for PCB ballasts PCBs in paint the **15** samples of concrete and the **4** samples of abrasive blasting waste (from the abrasive blasting pit and collection hoppers) being analyzed for RCRA metals also need to be analyzed for PCBs	Fluorescent light fixtures may contain PCB-containing ballasts PCB-containing ballasts in B333 will need to be identified and segregated as a separate waste stream There are multiple layers of paint within the building, and some of the paint may contain PCBs PCBs were historically added to paints applied to thermally hot surfaces PCB concentrations in the concrete may make the concrete subject to TSCA regulation Therefore, it is necessary to analyze the concrete and the blasting waste for PCBs Concrete samples will be pulverized, homogenized, and then split Part of the sample will be analyzed for total PCBs, and the other part of the sample will be analyzed per the TCLP
Asbestos	Inspection for friable and non-friable asbestos Approximately **20** samples from suspect ACM	The interior and exterior of B333 will need to be inspected for both friable and non-friable asbestos (e g , walls, floors tiles, roofing material, adhesives, insulation) Sampling will be conducted at the discretion of a Colorado Department of Public Health and Environment-certified asbestos inspector

expected, therefore these structural items/materials have no greater probability for contamination than other structural surfaces, and may remain in place for pre-demolition survey Radiological measurements and samples (if necessary) will be collected per the RFETS Radiological Safety Practices 16 00 Series, as applicable

Non-Radiological Characterization

The non-radiological contaminants of concern were determined to be organic solvents (toxicity-characteristic volatile organic compounds -- VOCs), RCRA (toxicity-characteristic) metals, PCBs, beryllium, and asbestos-containing materials Core sampling for VOCs, metals and PCBs will be performed in accordance with PRO-487-MPCR *Metals and PCB Characterization Procedure* and PRO-488-BLCR *Bulk Solids and Liquids Characterization Procedure* Beryllium sampling of porous and non-porous surfaces will be performed in accordance with PRO-536-BCPR *Beryllium Characterization Procedure* Asbestos sampling and analyses will be performed per PRO-563-ACPR, *Asbestos Characterization Procedure*

Existing data from previous asbestos sampling in B333 were reviewed by the Project's state-certified asbestos inspector The existing data are limited and incomplete The most recent sampling took place in 1995, and sample locations are often indeterminate It appears as though abatement of asbestos-containing TSI elbows may have occurred in the past Whether this occurred before or after 1995 is not known In addition, the samples collected are insufficient to meet the required number of samples necessary based on square or linear footage For the purpose of demolition of B333, a more detailed sampling program will be necessary to ensure regulatory compliance

Historical results of total metals in paints were also reviewed as part of the characterization planning These results indicate that lead in paints would fail if the "20x rule" were applied (as a comparison with toxicity characteristic thresholds) However, because the paints are not planned for separation from the concrete slabs or cinderblock surfaces, and the paints will not constitute a separate waste stream, the historical results are not applicable to the current DQOs, and cannot be used in lieu of the planned sampling and analysis

2.0 DATA QUALITY OBJECTIVES

This section defines the DQOs for RLC and PDS in preparation for release of B333

2.1 The Problem

The nature and extent of radiological, chemical, and physical hazards in B333 are not known with sufficient confidence to characterize waste streams resulting from the D&D, including unrestricted release of material (as sanitary waste) based on radiological measurements

2.2 The Decisions

Are sanitary waste and unrestricted-release criteria met relative to potential chemical and radiological hazards, respectively?

2.3 Inputs to the Decision

The inputs to the decision include the planned RLC and PDS results, historical information generated from previous characterization activities (e g , scoping characterization, etc), and the applicable unrestricted release criteria Specifically, inputs to the decision rule include

- radiological survey/scan measurements (within each survey unit) of all B333,
- asbestos inspection and sampling results,
- inspection of fluorescent light fixtures for PCB-containing ballasts,
- quality assurance aspects of the data, including precision, accuracy, representativeness, completeness, comparability, and sensitivity (i e , the PARCCS parameters),
- unrestricted release criteria (1-P73-HSP-18 10, Appendix 1),
- 40 CFR 761 (PCB regulations),
- 40 CFR 763 and 5 CCR 1001-10 (asbestos regulations),
- 6 CCR 1007-3, Parts 261 and 268 (hazardous waste regulations), and
- RFETS Occupational Safety and Industrial Hygiene Program Manual, Chapter 28, Chronic Beryllium Disease Prevention Program

Field measurement and laboratory analysis planned to assess radiological and chemical hazards are controlled by K-H Analytical Services Division through contractual requirements with onsite and offsite (radiochemistry) vendors All instrument sensitivities are adequate for producing results comparable to unrestricted-release criteria and compliance with DOT requirements

2.4 Decision Boundaries

Three-dimensional boundaries for defining the levels and extent of radioactive and chemical contamination are restricted to the interior and exterior surfaces of the building, and do *not* include the underlying soil The boundaries include the components of the abrasive collection system, including the two hoppers located outside on the west side of the building There are no temporal boundaries relative to technical data quality, time constraints depend only on project schedule

2.5 Decision Rules

The following are decision rules to be used during PDS

- If all radiological survey and scan measurements are below the surface contamination guidelines provided in DOE Order 5400 5 (Radiation Protection of the Public and Environment, see Table 7-1), and if all sample measurements are below the volume contamination thresholds provided in the No Radioactivity Added Waste Verification (NRA) Program (i e , Kaiser-Hill letter to DOE, RFFO, Application of Surface Contamination Guidelines from Department of Energy Order 5400 5, WAH-064-98, March 10, 1998, or per 3-PRO-140-RSP-09 03, Unrestricted Release of Bulk or Volume Material, etc), the related areas and/or volume are considered not radiologically contaminated

- If any radiological survey or scan measurement exceeds the surface contamination guidelines provided in DOE Order 5400 5, the related survey unit must be evaluated per the statistical tests described in section 7 0, Data Analysis and Quality Assessment, of this plan

- If any radiological sample measurement exceeds the volume contamination threshold provided in the NRA Program (i e , Kaiser-Hill letter to DOE, RFFO, Application of Surface Contamination Guidelines from Department of Energy Order 5400 5, WAH-064-98, March 10, 1998, or per 3-PRO-140-RSP-09 03, Unrestricted Release of Bulk or Volume Material, etc), the related volume of material is considered radiologically contaminated

- If any radiological sample measurement (or disposal unit volume) exceeds 100 nanocuries per gram of transuranic material, the related volume of material is considered transuranic (TRU) waste

- If decommissioning waste exhibits a characteristic of a hazardous waste, then the waste is classified as hazardous waste in accordance with 6 CCR 1007-3, Parts 261 and 268

- For B333, which will be demolished, if PCB-containing ballasts are identified, the ballasts will be segregated as a separate waste stream If the 90% Upper Confidence Limit of PCB concentration exceeds the action level of 50 parts per million (ppm), then the material must be managed as PCB-waste, otherwise, PCB contamination is not present

- If surface concentrations of beryllium are equal to or greater than 0 2 μg/100 cm^2, the material is considered beryllium contaminated per RFETS Occupational Safety and Industrial Hygiene Program Manual, Chapter 28, Chronic Beryllium Disease Prevention Program

- For asbestos, if any single sample of a sample set representing a homogeneous medium results in a positive detection (i e , >1% by volume), then material is considered asbestos-containing material (ACM), in accordance with 40 CFR 763 and 5 CCR 1001-10 Otherwise the material is considered non-ACM

2.6 Tolerable Limits on Decision Errors

The number of survey points was determined as prescribed by MARSSIM §5 5 2 3 and Appendix B of the Site-approved *Pre-Demolition Survey Plan for D&D Facilities, Rev 0* (PDSP) An estimate of relative shift (σ/Φ) as two, coupled with a 5% acceptable error for alpha and beta, respectively, resulted in 15 random measurement locations per survey unit

Sample locations for potential non-radioactive hazards, based on visual inspections and process knowledge, are biased toward the most likely areas of spills and particulate deposition

2.7 Optimization of Plan Design

Statistically-based radiological surveying and sampling (if media sampling is required) will be conducted per the guidance in Section 5 5 of MARSSIM, the PDSP, 3-PRO-165-RSP 16 02, *Contamination Monitoring Requirements*, and 3-PRO-165-RSP-16 03, *Radiological Sampling of Building Media* The location of radiological survey/sampling points will be delineated per the guidance provided in Section 5 5 of MARSSIM Radiological field measurement methods and instrumentation will be delineated per the guidance in Section 6 of MARSSIM Radiological sampling and preparation for laboratory measurements will be delineated per the guidance in Section 7 of MARSSIM

Isolation Control signs will be posted on access areas of completed survey units Signs shall state the approval from Radiological Safety and/or Environmental Health & Safety will be required prior to the storage or transfer of radioactive/RCRA materials within the areas

Actual survey measurements will be used to re-calculate the original MARSSIM survey design to insure adequate power in the number of survey measurements (i e , 15 TSA and 15 Removable per survey unit)

Non-radiological samples may be evaluated to ensure that enough samples were acquired to make RLC decisions Specifically, EPA QA/G-4 may be applied to metals and PCB results, asbestos samples are biased, based on site inspections, and QA/G-4 does not apply

3.0 CHARACTERIZATION INSTRUCTION FOR RADIOLOGICAL SURVEYS

Building 333 will have radiological characterizations performed pursuant to the MARSSIM, the PDSP, and applicable RFETS Radiological Safety Practices (RSPs) RSPs governing the pre-demolition radiological characterization are listed below

- *PRO-475-RSP-16 01, Radiological Survey/Sampling Package Design, Preparation, Control, Implementation and Closure*
- *PRO-476-RSP-16 02, Radiological Surveys of Surfaces and Structures*
- *PRO-477-RSP-16 03, Radiological Samples of Building Media*
- *PRO-478-RSP-16 04, Radiological Survey/Sample Data Analysis*
- *PRO-479-RSP-16 05, Radiological Survey/Sample Quality Control*

3.1 Background

An historical assessment of B333 shows little or no potential for having DOE-controlled radiological contamination (i e , uranium [non-NORM], plutonium, americium, and their respective progeny) Constructed in the early 1950's, the facility was used as a painting facility Its initial construction consisted of what is currently Rooms 100, 101, and 105 The east garage-bay area was added in the late 1960s The west addition of a sand-blasting/paint-removal shop was constructed in 1973-74 The sand-blasting operation required installation of an abrasive hopper and blower equipment on the west-side of the building Although technically not part of the main structure of B333, this piece of equipment will be included in the pre-demolition characterization No laboratories were located in the building, and weapons production activities never occurred in B333 Based on this historical assessment, B333 was initially classified as a Type 1 Building (MARSSIM - Impacted Class 3 and Non-Impacted above 6 feet on interior surface areas), because no areas of the structure are expected to contain any residual radioactivity from DOE-controlled radioactive materials

The lack of historical radiological survey data and the (remote) potential for an undocumented introduction of DOE-controlled radioactive materials into B333 requires the performance of a pre-demolition radiological characterization

3.2 Survey Breakdown Structure

Building 333 consists of a small office and administrative area, locker room/bathroom, three painting bays (east-side) and sandblasting operations area (west-side) The sand-blasting facility is separated by a windowless wall from the paint shop operations area (see Attachment 1 for details) The two areas are not connected within the building, and access can be gained only by exiting one area and entering the other area via external doors A major component of the exterior of B333 includes the sandblasting equipment (hopper and blower units) attached to the west side of the building

B333 will be divided into three survey areas

- A – the entire interior of B333
- B – the exterior walls of B333 (including the exterior sand-blasting equipment)
- C – the roof of B333

These survey areas are broken down further into 4 survey units based primarily on similar characteristics and contamination potentials Survey unit designations are described in Table 3-1 The interior survey units are shown in the attached floor-plan map (Attachments 1)

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Table 3-1: B333 Survey Breakdown Structure

Survey Area & Unit (Survey Package ID No)	Description	Approx Floor Area (m^2)*	Survey Unit Classification
Survey Area A (interior)			
Unit 333-A-001	Paint Shop (Rms 100, 100A - C, 101, 102, 102A & 105)	182	Impacted Class 3/Non-Impacted (> 6 feet)
Unit 333-A-002	Sand Blast Area (Rms 103 & 104)	60	Impacted Class 3 (all interior areas, including > 6 feet)
Survey Area B (exterior walls)			
Unit 333-B-003	All exterior walls – including the exterior sandblasting equipment	400 **	Impacted Class 3
Survey Area C (Roof)			
Unit 333-C-004	Roof	282	Impacted Class 3

* Floor areas are approximated from floor-plan drawings Actual areas on survey unit maps will be to scale
** Note that survey unit addresses exterior wall surface areas only, floor surface area not applicable

3.3 Radiological Survey and Sampling Methodology

The radiological contaminants of concern for the purposes of surveys and sampling are consistent with the standard isotopic suite routinely investigated at the RFETS - uranium, plutonium and americium For the purposes of this pre-demolition radiological characterization, the more restrictive transuranic release limits required in DOE Order 5400 5, and as listed in Table 7-1 of the Site PDSP, will suffice in determining acceptable and unacceptable levels

Radiological Engineering has determined that use of the more restrictive transuranic release limits precludes the need for beta-gamma measurements for radiological characterization of actinides of concern specific to the RFETS (Technical Basis Document [TBD] – 00157, *Building 371 Technical Position Paper – Basis for Performing Solely Alpha Contamination Surveys for Buildings 371/374, Rev 1, 7/18/2000)*

The historical assessment performed in preparation of this package found no history of radiological operations in the facility The Waste Stream Identification and Characterization Report (WSRIC) for B333 (PADC-1994-01472) lists all potential waste streams as "non-radioactive" However, a conservative approach was taken towards an examination of the possible inadvertent introduction of radiological contamination into B333 Radiological Engineering looked at the process knowledge of RFETS (as a whole), which indicates the primary nuclides of concern to be plutonium (Pu-238, Pu-239, Pu-240, Pu-241 and Pu-242) of varying enrichments, americium (Am-241), and uranium (U-234, U-235, and U-238) of varying enrichments [along with each isotopes respective progeny] The only nuclide with significant beta activity is Pu-241 The only plutonium with a high quantity of Pu-241 is "reactor grade" plutonium, an isotopic mix not produced during historical operations at the RFETS

The ratio of Beta to Alpha activities for the isotopic "blends" that are found at RFETS are listed below

- Weapons Grade Plutonium (30 yr Old) 1 04
- Depleted Uranium 1 8
- Highly Enriched Uranium 0 03

The presence of fission products was also considered during the development of the survey methodology for B333 However, it is highly unlikely that any fission products would exist without the presence of plutonium contamination, therefore, transuranic limits would be exceeded before fission product limits would be exceeded

Based on this assessment of the remote potential for inadvertent introduction of radioactive materials commonly found at the RFETS, beta-gamma measurements are unnecessary For materials contaminated with plutonium, uranium, or mixtures of both, the alpha activity release limit is more restrictive than the uranium and beta-gamma emitter release limits required by DOE Order 5400 5 Therefore, alpha scans and contamination surveys will be used to assess the radiological contamination in the B333 Cluster

A Survey Package and Data Summary will be produced for each survey unit Survey Packages will contain a cover sheet, survey/sampling instruction form, total surface activity data sheet, removable contamination data sheet, instrument sheet, investigation forms, signature sheets, and other required documentation as prescribed in the PDSP (Rev 0)

Survey maps will be developed to accurately define the boundaries of each survey unit and document specific measurement locations Measurement locations will be clearly identified to provide a method of referencing survey results to survey/sample locations All survey units are designated Impacted Class 3, therefore, specific survey points in each survey unit will be established on a random basis These randomly-generated survey points will be determined in accordance with PRO-475-RSP-16 01, *Radiological Survey/Sampling Package Design, Preparation, Control, Implementation, and Closure*

Should any surveys exceed action levels as specified in the PDSP, samples will be acquired to determine the specific isotopes causing elevated readings Samples will be analyzed via alpha spectroscopy

3.3.1 Surface Scans

Surface scan coverage for each Impacted Class 3 survey unit will be a minimum of 10 percent (10%), as listed in Appendix A, Table A-1 of the PDSP Surface scanning for alpha activity will be biased towards areas of suspected contamination such as carpet surfaces, flooring, corner areas, lower walls, and window ledges If contamination is found on lower areas of the survey unit, scans should be performed on the upper surfaces of the survey unit Due to its tar/gravel surface construction, the roof of the B333 structure does not lend itself towards radiological scanning For this survey unit, scanning will be biased towards areas that are more easily scanned, such as ventilation ducting, heating, ventilation, air conditioning (HVAC) system component exteriors, and other "non-gravel" areas Survey unit maps of the roof will denote these areas, and the survey unit package for the roof will instruct the survey technicians to focus attention on these survey-able areas Figure 3 1 shows the methodology to be used for performing alpha scan surveys

If an area of activity is identified as greater than 75 percent of the applicable DCGL during the scan of a survey unit, an investigation will be performed to confirm the presence of elevated activity If elevated activity is confirmed, the location of interest shall be marked, and surface activity measurements for total and removable activity shall be performed at that location Figure 3 2 shows the investigation methodology to be used for performing an investigation

Figure 3.1 Alpha Scanning Methodology (using a DP6 probe)

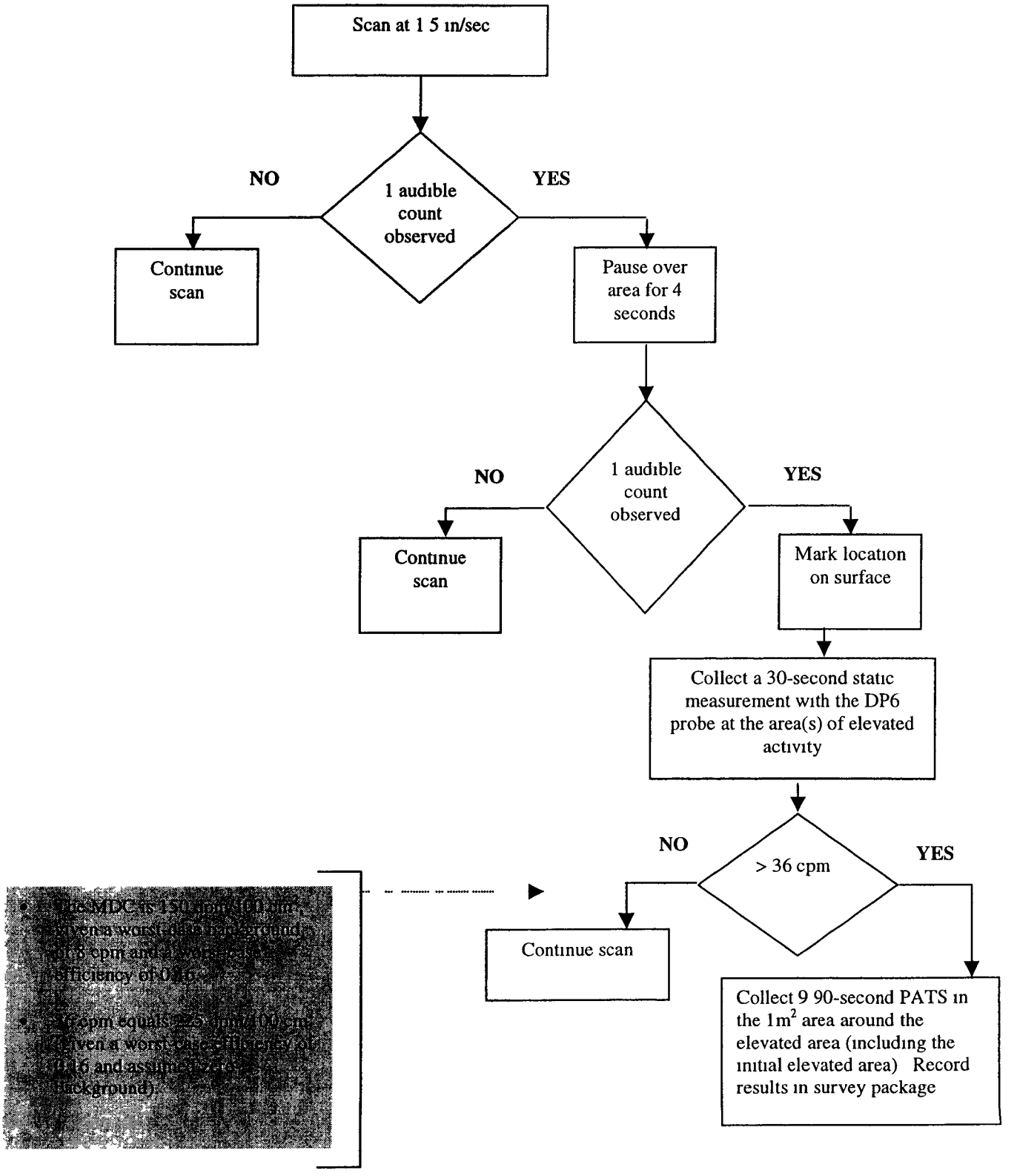
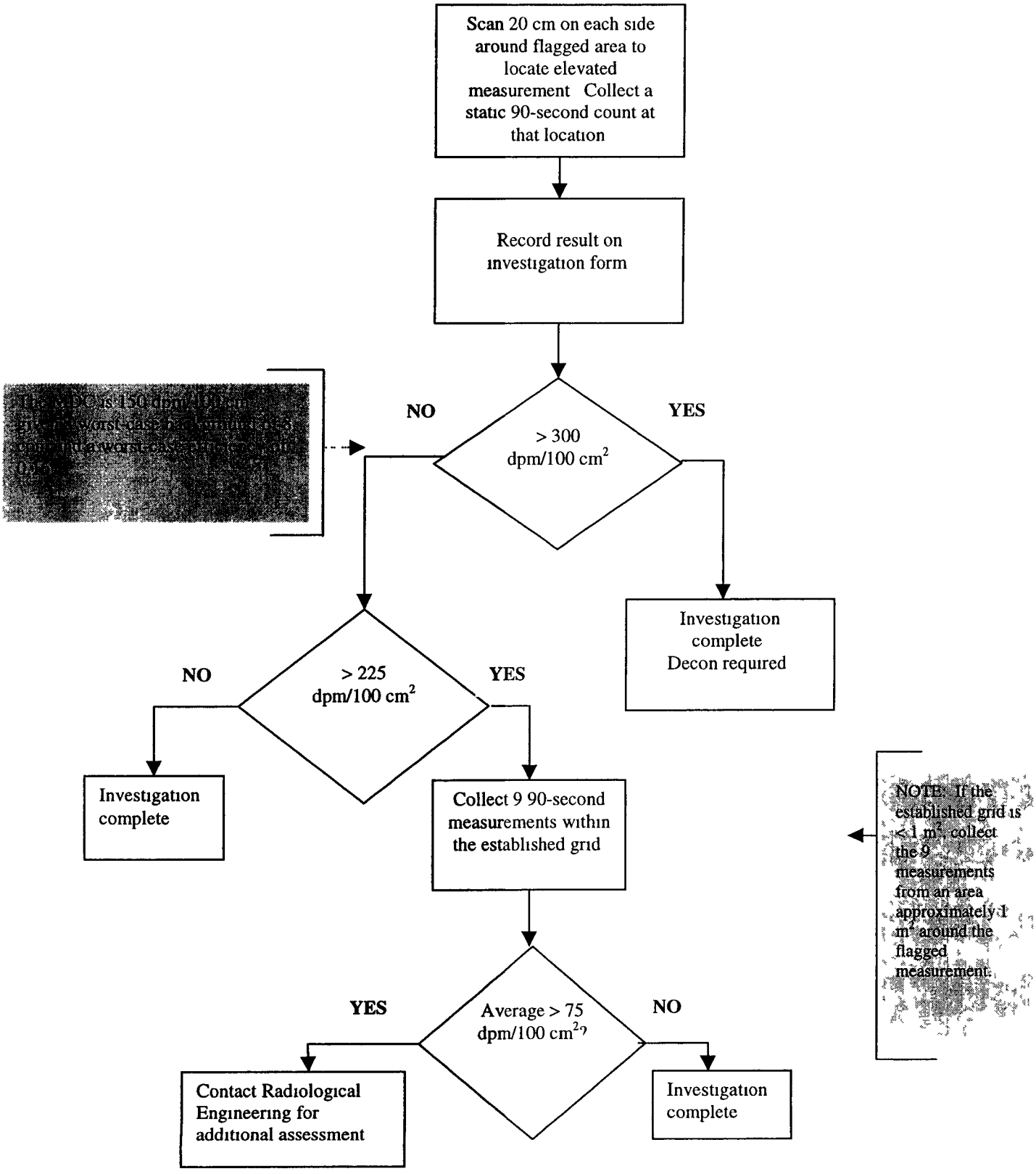


Figure 3.2. Investigation Method for Elevated Alpha Scan Reading (DP6 Probe)



Note that investigation locations will be additions to the randomly-prescribed number of measurements for that survey unit This additional measurement location will not be included in the survey unit statistical test Rather, it will be compared directly to the applicable elevated measurement comparison criteria $DCGL_{EMC}$ (for 100 cm^2) and the $DCGL_W$ (for an average over m^2)

3.3.2 Surface Activity Measurements

Total and removable surface activity measurements shall be collected at random measurement locations The minimum total surface activity and removable surface activity readings required for each survey unit shall be 15 measurements (i e , 15 total activity measurements and 15 removable activity measurements) This minimum number of measurements was determined using the Total Surface Activity Measurement Calculation Worksheet presented in Appendix B of the PDSP Survey points will be randomly generated and may fall on any surface area of the survey unit (e g , floors, walls, ceilings, etc)

If any randomly-generated survey point falls on a carpeted floor, an adequate area of the carpet shall be radiologically scanned, cut and removed If any randomly-generated survey point falls on a surface that is coated with "foreign" paint/sealant (e g , areas that contain residual paint from B333 operations and not the structure's original or intended paint), Radiological Engineering and Industrial Hygiene will determine the removal techniques required to obtain measurements Radiological measurements (total activity and removable activity) on the flooring below the carpeted/painted surface will be documented on the appropriate forms

The Radiological Control Technician (RCT) will obtain 100 cm^2 total alpha direct measurements (and an accompanying local area background measurement) at each labeled measurement location per 3-PRO-165-RSP 16 02, *Contamination Monitoring Requirements* The RCT will record the results of each measurement on the applicable survey unit's *Total Surface Activity Data Sheet*

The RCT will obtain 100 cm^2 removable alpha measurements (smears) at each labeled measurement location per 3-PRO-165-RSP 16 02, *Contamination Monitoring Requirements* The RCT shall record the results of each measurement on the applicable survey unit's *Removable Contamination Data Sheet*

3 3 3 Surface Media Sampling

Based on the radiologically "benign" nature of B333, surface media sampling for isotopics is not anticipated for any of the identified survey units (surface media samples are typically not required for Class 3 survey units)

If elevated readings are found (due to DOE-added radionuclides) during the radiological characterization of the roof, surface media samples may be collected and analyzed as described in the PDSP (Rev 0) and the applicable RSPs Samples are normally collected at the total/removable surface activity measurement locations of interest (i e , areas of elevated activity) If at all possible, the depth of the sample should be minimized to avoid skewing the pCi/g to dpm/100 cm^2 conversion (required to compare media sample results against DOE 5400 5 release criteria) The ideal sample size is 100 cm^2 or approximately 5 - 10 grams of material, whichever is possible

3.4 Radiological Survey QC Requirements

Quality assurance (QA) and QC requirements as presented in the PDSP and RSP-16 05, *Radiological Survey/Sample Quality Control* will be implemented during the pre-demolition radiological characterization to collect information necessary to evaluate the survey results

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To establish the overall precision, or reproducibility of surveys, duplicate measurements shall be performed As listed in the PDSP, the minimum number of required QC total surface activity surveys are described below

> "Greater than or equal to 5% of the direct measurement surveys shall be repeated, and a quantitative assessment shall be performed where acceptance of the comparison is constituted by either (1) both results are < DCGL or (2) there is less than 20% difference between the two duplicate measurements "

Removable activity measurements do not require duplicate QC measurement comparison

The duplicate total surface activity measurements shall be either random or, if biased, biased towards areas with higher contamination potential (e g , floors, drainage areas, ledges, etc)

As stated, the minimum number of total surface activity measurements for an Impacted Class 3 survey unit is 15 Using the aforementioned QC requirements, a minimum of two total surface activity QC measurements per survey unit is anticipated These QC measurements should be performed with a different survey instrument (if possible) and by a different technician than the person who performed the initial survey Forms within each survey package shall accommodate and easily distinguish QC measurements, and the Data Summary calculation sheets will compare the measurements as well

3.5 Summary

Radiological Engineering has divided B333 into three survey areas (A – C), with four individual survey units The historical assessment of B333 suggests little or no potential for radiological contamination Survey units are classified as Impacted Class 3 and Non-Impacted As stated, Non-Impacted survey unit areas are areas greater than 6 feet (in height) on the interior walls and ceilings of the paint shop The sand blasting interior areas are classified as Impacted Class 3 over all interior surface areas, due to the aggressive removal activities that occurred in this area See Table 3-1 of this document for details on individual survey areas and their respective survey units

Appendix A of the RFETS PDSP (MAN-127-PDSP, Rev 0) lists a 10 % minimum scanning frequency for all Impacted Class 3 survey units Scans will be biased towards areas traditionally found to contain contamination (e g , floors, carpeting, lower walls)

As prescribed in Appendix B of the PDSP, the default values to be utilized when minimal characterization is available in an Impacted Class 3 survey unit are as follows

- Minimum of 15 Total Surface Activity measurements for each survey unit
- Minimum of 15 Removable Surface Activity measurements for each survey unit

Wherever a randomly-generated sample point falls on a carpeted area or area with residual paint/coating from B333 operations, an adequate area of material will be removed and radiological surveys will be performed on the flooring surface

Radiological Engineering does not anticipate the need for media samples to be collected in any of the survey units as a requisite to MARSSIM-based survey designs Surface media samples are typically not required for Class 3 survey units However, surface media sampling will be performed, if deemed necessary, based on data collected during B333 pre-demolition radiological characterization

Based on this pre-demolition radiological assessment, the following number of measurements are anticipated

4 Survey Units x 15 TSA Measurements / Unit = 60 TSA Measurements

4 Survey Units x 15 Removable Activity Measurements / Unit = 60 Removable Measurements

4 Survey Units x 2 TSA (QC) Measurements / Unit = 8 TSA (QC) Measurements

6 (5 real plus 1 QC) radiochemical (media) samples, 2 from spent abrasives, 4 from painted concrete slab

Total Number of Radiological Measurements 134

This estimate does not include the need to further characterize/investigate areas with elevated activities, and does not anticipate the need for surface media sampling to occur in any of the Impacted Class 3 survey units described in Table 3-1

4.0 CHARACTERIZATION INSTRUCTION FOR NON-RADIOLOGICAL INSPECTION AND SAMPLING

4.1 RCRA Metals and Volatile Organics Compounds

Some of the B333 floor in the thinner cleaning area (east side of Room 102A) and the satellite accumulation area (east side of Room 102) could be contaminated with solvents used to clean paint brushes and other painting equipment Therefore, the two concrete samples from these areas need to be analyzed for VOCs to determine if solvents contaminated the floor, or if past spills evaporated and/or were cleaned up below action levels Also, the B333 floor contains multiple layers of paint When there was a paint spill onto the floor, the paint was used to add another layer Some of the paint contained lead and other metals, and therefore, the concrete could exhibit hazardous waste characteristics Therefore, it is necessary to analyze the concrete for metals (all 15 samples) Under routine characterization of other Type 1 facilities, sampling of paint on floors would not be necessary, however, because of the very thick paint layers in this particular building K-H Environmental Systems and Stewardship concluded that application of a bulk debris rule to the concrete slab is not appropriate (see Environmental/Waste Compliance Guidance No 27, *Lead Based Paint (LBP) and LBP Debris Disposal and* 40 CFR §§ 257 and 258) TLCP sampling results will indicate if concrete will need to be managed as hazardous waste According to historical and process knowledge, no other regulated chemicals were used or stored in B333 (*D&D Facility Characterization Interview Checklist and Facility Checklist*)

It is assumed that the walls were painted much less frequently (less impacted by painting operations) and that the wall materials would not exhibit hazardous waste characteristics Therefore, sampling of walls is not necessary (refer to Environmental Waste Compliance Guidance #27, *Lead-based Paint (LBP) and Lead-based Debris Disposal*)

Abrasive blasting was used to clean materials prior to painting The abrasive blasting waste may possess hazardous waste characteristics from metals in paints cleaned off previously painted materials Paint wastes have been assigned a RCRA D008 waste code TCLP metals results will indicate hazards presented by the abrasive and related equipment, including the air cleaning equipment and the abrasive collection system

A total of 15 core samples from the concrete floor (3 from the west paint booth area, 3 from the east paint booth area, 3 from the satellite accumulation area and adjacent sign shop area, 2 from the thinner cleaning area, 2 from the abrasive blasting pit, one from the containment in Room 104, and 1 duplicate) Consistent with the DDCP, sampling precision of the concrete samples will be evaluated based on a field QC sample, the duplicate In addition, four samples of abrasive blasting waste will be taken (two from the abrasive blasting pit and two from the abrasive collection hoppers), because of the relatively small area and volume represented by the spent abrasives, a QC (duplicate) sample is not required

Concrete samples will be pulverized, homogenized, and split at the laboratory as part of the routine sample preparation Part of the sample will be analyzed per the TCLP, and the other part of the sample will be analyzed for total PCBs All 15 TCLP samples will be analyzed for metals, and 3 of the TCLP samples will be analyzed for VOCs Sampling will be performed in accordance with PRO-487-MPCR *Metals and PCB Characterization Procedure* and PRO-488-BLCR *Bulk Solids and Liquids Characterization Procedure*

4.2 Beryllium

There is no record of beryllium operations or storage having been conducted in B333 (*D&D Facility Characterization Interview Checklist and Facility Checklist,* and the *CBDPP List of Known Beryllium Areas*) However, some beryllium-contaminated items may have been brought into the building (e g , been sand-blasted prior to painting) Therefore, there is the potential for beryllium-contaminated dust to have been generated and dispersed throughout the building Sampling results will indicate if surfaces present any beryllium hazards

Ten swipe samples will be taken from biased locations in the abrasive blasting area and painting/drying areas (i e , where dust may have settled) to confirm the historical evidence that B333 is not impacted by beryllium Beryllium sampling of porous and non-porous surfaces will be performed in accordance with PRO-536-BCPR *Beryllium Characterization Procedure*

4.3 PCBs

B333 must be evaluated for PCBs The building contains fluorescent light ballasts that may contain PCBs All fluorescent light fixtures will be inspected to identify PCB ballasts PCB ballasts will be identified based on factors such as labeling (e g , PCB-containing and non-PCB-containing), manufacturer, and date of manufacturing All ballasts that do not indicate non-PCB-containing will be assumed to be PCB-containing PCB containing ballasts will need to be disposed of as described in Environmental / Waste Compliance Guidance No 27, *Management of Fluorescent Light Ballasts*

There also are multiple layers of paint on the building floor (from paint spills), and some of the paint may contain PCBs PCBs were historically added to paints applied to thermally hot surfaces PCB concentrations in the concrete floor may make the concrete subject to TSCA regulation Therefore, the 15 samples of concrete being analyzed for RCRA constituents also need to be analyzed for PCBs In addition, the 4 samples of abrasive blasting waste need to be analyzed for total PCBs Under routine characterization of other Type 1 facilities, sampling of paint on floors would not be necessary, however, because of the very thick paint layers in this particular building K-H Environmental Systems and Stewardship concluded that application of a bulk debris rule to the concrete slab is not appropriate (see Environmental/Waste Compliance Guidance No 27, *Lead Based Paint (LBP) and LBP Debris Disposal and* 40 CFR §§ 257 and 258)

Based on visual observations, the walls were painted much less frequently than the floors (i e , they were not impacted by paint spills) therefore the wall materials are subject to the debris rules previously discussed

Concrete samples will be pulverized, homogenized and then split Part of the sample will be analyzed for total PCBs, and the other part of the sample will be analyzed via the TCLP Sampling will be performed in accordance with PRO-487-MPCR *Metals and PCB Characterization Procedure* and PRO-488-BLCR *Bulk Solids and Liquids Characterization Procedure*

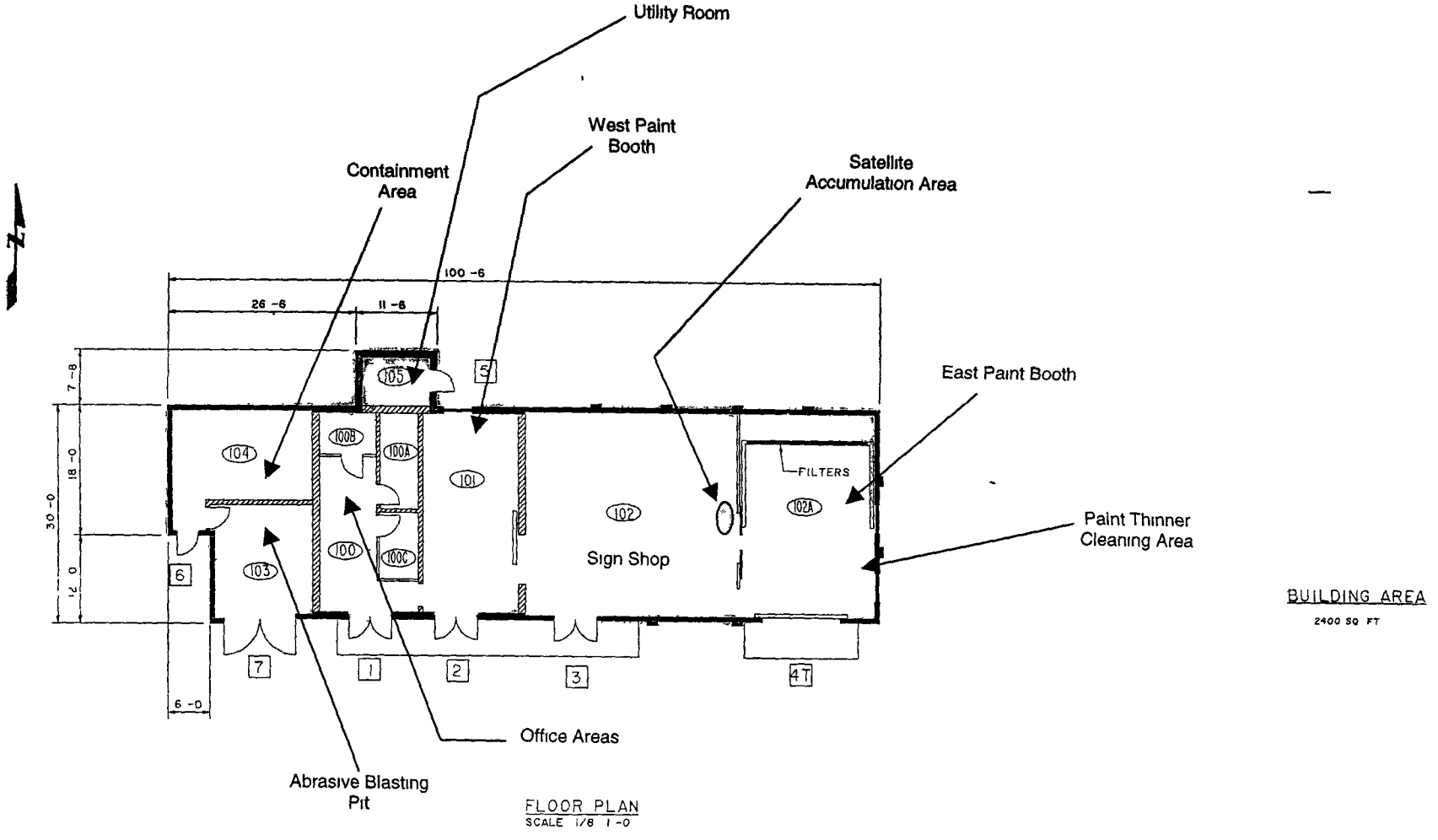
4.4 Asbestos

B333 will be inspected for friable and non-friable asbestos by a CDPHE-certified asbestos inspector in accordance with PRO-563-ACPR *Asbestos Characterization Procedure Revision 0* Asbestos will be differentiated as friable and non-friable Potential asbestos-containing material will be identified for sampling at the discretion of the CDPHE-certified asbestos inspector Samples of materials will be taken using a Wondermaker™, razor knife, or similar appropriate sampling tool All bulk samples collected will be analyzed utilizing EPA 600/M4-82020, December 1982 *Interim Method for the Detection of Asbestos in Bulk Insulation Samples* by an NVLAP-accredited laboratory

5.0 Summary

Existing data on hazards associated with B333 are insufficient to address the applicable DQO decision rules Additional radiological and non-radiological measurements and sampling are necessary Individual Survey Unit Packages will be developed and included as an appendix to the implementing work control document for the activities included in this Characterization Package After all radiological and non-radiological measurements and samples have been collected and analyzed, an RLCR/PDSR will be generated to summarize the results

Attachment 1. Building 333 Floor Plan



FLOOR PLAN
SCALE 1/8 1-0

BUILDING AREA
2400 SQ FT